

**MATH 111 - LINEAR MATH MODELLING, SPRING 2022**  
**SECTION H02, MW 9:00-10:15AM**

**Instructor:** Simone Mazzini Bruschi

Office: Exploratory Hall, room 4221

Office hours: Monday & Wednesday 10:45am-12:15pm

and by appointment

Email: sbruschi@gmu.edu

IMPORTANT: Always start the subject line of email with the code of the course and section (Math 111-H02) followed by the specific subject. For instance and email about office hours should have the following subject line: "Math 111-H02 Office hours"

**Textbook and Materials:** *Finite Mathematics and Its Applications* 12th edition, by Goldstein, Schneider and Siegel, Pearson 2018.

Math 111 - Data Fitting Notes - available on Blackboard - left menu.

**Course Description** This course meets the quantitative reasoning requirement, one of the Foundation requirements of the Mason Core. The goal of the Foundation requirement is to help ensure that students are equipped with the tools and techniques necessary to succeed in college and throughout their lives and careers. We will cover the following topics:

- Linear Equations
- Linear Systems and Matrices
- Leontiff Input/Output Analysis
- Markov Processes
- Data Fitting - Polynomial Interpolation, Least Squares

**Course Testing schedule:**

	Date and Time
Quiz 1	Wednesday, February 09
Midterm 1	Monday, February 28
Quiz 2	Wednesday, March 23
Midterm 2	Wednesday, April 06
Quiz 3	Wednesday, April 27
Final	Monday, May 16 - 7:30am - 10:15am

**Homework:** Homework will be set after each section is completed, and will be posted under the corresponding Blackboard link. Completing the homework assignments is the minimum of work you should be doing outside of class. Homework will not be collected or graded, but completing it is essential. You are encouraged to discuss the homework problems amongst yourselves and to make use of the office hours. All of the odd-numbered questions in the book have solutions in the back and you should attempt as many of those as you felt you need to.

**Worksheets:** Students will need to complete worksheets in most classes. The worksheets will be collected at the end of the class. Each worksheet counts 5 points. Each student can miss at most 3 worksheets in total during the semester. At the end of the semester, the total points will be adjusted to 100 points.

**Grading:**

Worksheets	11%
Quizzes:	8% for each quiz
Midterm :	20% each
Final Exam:	25%

Your course total (out of 100) will be converted into your letter grade by the following table.

A-, A	90 – 100
B-, B, B+	80 – 89
C-, C, C+	70 – 79
D-, D, D+	60 – 69
F	0 – 59

+ or – may be attached to the grade for *approximately* the upper or lower 2 points.

**Technology:**

- Matlab to help with matrix calculations This software is available for students use remotely on mason.gmu.edu. The system requires your PatriotPass.
- Desmos is a free software that we will use for graphing models and making scatter plots of Data Sets

**Calculator:** You will need a calculator for class work, homework, and exams. Any calculator that does arithmetic and exponential calculations is acceptable. Matrix computations on exams and homework are to be done by hand.

**Exams Make up Policy:** Quizzes, midterms and the final exam are all scheduled since the beginning of the semester. Please pay attention to these dates when scheduling any other activity/appointment. If you have an emergency, or health issue please let me know as soon as possible (preferably before the exam).

**Academic integrity:** To promote a stronger sense of mutual responsibility, thrust, and, fairness among all members of the Mason community, and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code:

**Student members of the George Mason University community pledge not to cheat, plagiarize, steal, lie in matters related to academic work**

For the remainder of the code, see: <http://oai.gmu.edu/mason-honor-code>

**Students with Disabilities:** All academic accommodations must be made through the Office of Disability Services (ODS) at 703.993.2474. Students must provide a copy of their Faculty Contact Sheet in order to receive accommodations. Note that accommodations are not retroactive. <https://ds.gmu.edu>

**Equity and Inclusion:** George Mason University is an intentionally inclusive community that promotes and maintains an equitable and just work and learning environment. We welcome and value individuals and their differences including race, economic status, gender expression and identity, sex, sexual orientation, ethnicity, national origin, first language, religion, age, and disability. Please email me if you have any concerns about any feeling of inequity in this course.

**Attendance Policy:** Students are expected to attend all classes. If a student misses a class, it is their responsibility to get notes and relevant information on what they missed.

**Tutoring Center:** GMU Math Tutoring Center: The Math Tutoring Center will be offering online tutoring services to students currently enrolled in undergraduate Math courses at GMU. More information can be found at <http://math.gmu.edu/tutor-center.php>  
<https://science.gmu.edu/academics/department-untis/mathematical-sciences/math-tutoring/tutoring-center-hours-and>

**Important dates:**

**Classes Begin** - January 24

**Last day to drop with no Tuition Penalty** - February 07

**Last day to drop with Tuition Penalty** - February 14

**Final Exam** - Monday, May 16, 7:30am-10:15am

### Weekly tentative schedule:

- Week 1:  
01/24 Linear Models and Graphs - Section 1.1  
01/26 Slope of a Line; Writing Linear Equations - Section 1.2
- Week 2:  
01/31 Intersection of a pair of lines, Intro to Matrix method of solving systems Sections 1.3, 2.1  
02/02 Matrix Method of solving systems of equations, Row Operations Section 2.1
- Week 3:  
02/07 Gaussian Elimination Section 2.2  
02/09 **Quiz 1** - Matrix Operations: Scalar and Matrix Multiplication, Addition Section 2.3
- Week 4:  
02/14 Inverse of a Matrix Section 2.4  
02/16 Matrix Equations Section 2.4
- Week 5:  
02/21 Gauss-Jordan Method of finding inverses Section 2.5  
02/23 Introduction to MatLab
- Week 6:  
02/28 **Midterm 1**  
03/02 Leontiff Input-Output Analysis - Section 2.6
- Week 7:  
03/07 Markov Processes Section 8.1  
03/09 Processes with Stable Distributions Section 8.2
- Spring Break: 03/14-03/20
- Week 8:  
03/21 Absorbing States and Absorbing Matrices - Section 8.3  
03/23 **Quiz 2** - Absorbing Markov Processes - Section 8.3
- Week 9:  
03/28 Data Fitting Introduction  
03/30 Data Fitting - Polynomial Interpolation
- Week 10:  
04/04 Functions: polynomial, exponential, power function  
04/06 **Midterm 2**
- Week 11:  
04/11 Data Fitting Models - Least Squares  
04/13 Data Fitting: Least Squares vs Polynomial Interpolation
- Week 12:  
04/18 Data Fitting Models - Polynomial model  
04/20 Data Fitting Models - Exponential Mode
- Week 13:  
04/25 1Data Fitting Models - Power Law Model  
04/27 **Quiz 3**
- Week 14:  
05/02 Data Fitting - Final Considerations  
05/04 Data Fitting - Final Considerations
- **05/16 Final Exam - 7:30 am - 10:15am**